



Technical Demonstration Summary Sheet

GLOBAL POSITIONING RADIOMETRIC SCANNER SYSTEM (GPRS)

THE NEED

The Idaho National Engineering and Environmental Laboratory (INEEL) is decontaminating and decommissioning facilities no longer in use. Before a facility or the land once occupied by that facility can be remediated or turned over for reuse it must be characterized for radiological contamination. To do this, a statistical grid is marked off and personnel with hand-held instruments survey the area to characterize the radiological contamination. Baseline technology can be a labor intense effort. A more cost effective survey methodology is needed for both characterization and final releases phases of the Decontamination & Decommissioning (D&D) Program.

THE TECHNOLOGY

The GPRS includes a radiological detection system, portable computer, differential global positioning system (d-gps providing real-time corrected positioning information), and a four-wheel drive vehicle. The detection system consists of two 4 in. x 26 in. x 1.5 in plastic scintillators housed in an 8 in. x 8 in. x 72 in. white enamel steel box. One controller adjusts the upper and lower detection limits on both scintillators simultaneously. Each detector is shielded with 1/8 in. of lead on the top and sides allowing only measurement data directly below the system to be gathered. The detectors are mounted on the front of the four-wheel drive vehicle at a height of 3 ft. The software program, Geosoft, generates a graphical representation of the data to visually identify the extent of contamination in an area (as shown in the diagram below). This technology has been proven to be very effective in operating in adverse terrain and providing real-time characterization information.

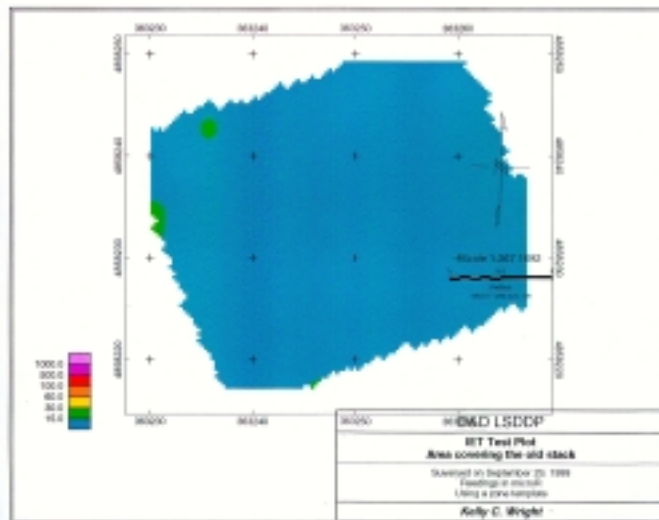
THE DEMONSTRATION

The INEEL demonstrated the GPRS in September 1999 as part of the large scale demonstration and deployment project (LSDDP) funded by the DOE Federal Energy Technology Center (FETC) for the D&D Focus Area. This demonstration took place at the INEEL Initial Engine Test (IET) Facility on the IET stack trench, an area approximately 80 ft. x 100 ft. The IET stack was slightly contaminated and was fell into a trench as part of the D&D efforts. The trench was then covered with soil to provide a radiological barrier. Prior to releasing the area to the Environmental Restoration Program, D&D Operations must characterize and map the area. The gridded area was surveyed by both technologies and the results were compared.

THE RESULTS

The GPRS proved to be an outstanding characterization tool. The GPRS system was operated at 5 miles per hour allowing it to collect the most accurate gamma radiometric data. While the baseline survey showed the area to be within releasable limits, the GPRS survey shows an area with radiation readings elevated above background. This area was a small subsidence (less than 1 ft wide x 2.5 ft deep) where the fill layer over the felled stack was insufficient to bring the levels to background or below. The subsidence was marked, the D&D facility manager notified, and corrective actions will be taken.

The hand survey required 65 minutes in comparison to the 15 minutes required for the GPRS survey, saving 77% in labor hours alone. Comparing the data, the hand survey results were simply stated as a range from 10-20 $\mu\text{R/hr}$. The GPRS results included radiometric data (counts per second for each of the individual detectors), geographical data (both latitude and longitude coordinates), altitude, time, and date. This information was stored in an onboard computer and was updated approximately every two seconds. As a result, more valuable detailed and accurate information was recorded by the GPRS for characterization of this area.



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BENEFITS

- 77% reduction in surveying labor hours
- Increased number of survey data points
- More accurate and reproducible survey results
- Real time, in-situ radiological measurements
- Visual representation of the extent of radiological contamination

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